

Seminar

Imaging a strain driven domain wall network with chiral junctions in an antiferromagnet

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Materials with antiferromagnetic order have recently emerged as promising candidates in spintronics based on their beneficial characteristics such as vanishing stray fields and ultra-fast dynamics. At the same time more complex localised non-coplanar magnetic states as for instance skyrmions are in the focus of applications due to their intriguing properties such as the topological Hall Effect. Recently a conceptual shift has occurred to envision the use of such magnetic defects not only in one-dimensional race track devices but to exploit their unique properties in two-dimensional networks. Here we use local strain in a collinear antiferromagnet [double layer of Mn/Ir(111)] to induce non-coplanar domain wall junctions, which connect in a very specific way to form extended networks. In this talk, I will show the SP-STM imaging of such networks and their building blocks. One of the interesting aspects of the networks is the existence of sizeable topological orbital moments arising from the localised junctions which consist of the non-coplanar 3Q state. I will mostly talk about the experimental observations and show some supporting DFT results. Lastly, the system consists of chiral junctions whose chirality stems from an exchange induced large structural shift of the top Mn layer which has also been characterised experimentally. The above findings can also be found in our paper recently uploaded on arXiv.

Friday, Oct 4th 2024

11:30 Hrs (Tea / Coffee 11:15 Hrs)

Auditorium, TIFR-H